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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,135	02/12/2002	Peter Thoma	US 20 01 0575	6579

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EXAMINER

SCOTT JR, LEON

ART UNIT PAPER NUMBER

2828

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/074,135

Applicant(s)

THOMA ET AL.

Examiner

Leon Scott, Jr.

Art Unit

2828

AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7,8 and 10-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,8 and 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Leon Scott, Jr.
Primary Examiner



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The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7, 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 7 and 12 it is not clear what the structure is which makes the end mirror (claim 7) or the three-dimensional retro-reflector (claim 12) partly transparent for coupling out an output beam. Further how does one determine what part of the beam, (i.e. what wavelengths) are permitted to pass from the end mirror (claim 7) or the three-dimensional retro-reflector (claim 12) as the output beam; claims 7 and 12 are indefinite and incomplete. In claim 11, it is not clear from the language of the claim what is the intent of claiming a *three-dimensional* retro reflector, since any retro reflector which has length, width and height is three-dimensional, and since the claimed retro-reflector functions as any other retro-reflector; claim 11 is indefinite and incomplete.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5,7,8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zorabedian et al (6,282,215) (see figs. 1A-8A), as applied in the previous rejections of claims 1 and 3 and claims 2,4-8 and 9 when considered with Hwu et al(6,002,703).

Zorabedian et al ('215) discloses: a laser medium (102) having a back facet (104) and a front surface (106), whereby the laser medium emits a laser beam through the front surface (106) into an external cavity defined in length by a cavity end mirror (122) reflecting the laser beam back towards the laser medium (see col. 4 lines 35-48) and a wavelength tunable filter (162) between the laser medium and the cavity end mirror (122) for tuning the wavelength of the laser beam, wherein the laser medium (102), the wavelength tunable filter (162), and the cavity end mirror (122) are arranged in a spatially linear cavity structure substantially in a line without angular re-direction of the laser beam in the cavity between the laser medium and the cavity end mirror (see fig. 1A and col. 4 lines 49-67 and col. 5 lines 1-67), at least one portion of the laser beam within the cavity after passing the wavelength tunable filter and before again passing the laser medium is coupled out as an output beam, and the cavity end mirror is partly transparent for coupling out a first output beam (see col 5 lines 41-46).

Applicant's representative alleged in a telephone conversation with the Examiner of record that the novel feature in amended claim 1 was that the prior art did not show a retro-

reflector end mirror with a curved surface. To this end the Examiner cites the reference to Hwu et al (6,002,703):

Hwu et al('703) discloses a laser system (30) which includes semiconductor laser (10), an external optical reflector (32), and a beam splitter (36). The optical reflector (32) preferably has a substantially parabolic cavity (34). The optical reflector (32) is oriented such that parabolic cavity (34) faces aperture (14) of semiconductor laser (10). Preferably, optical reflector (32) is a cylindrical parabolic reflector, with parabolic cavity (34) having a mirrored surface that reflects substantially all of the light emitted by semiconductor laser (10). The optical reflector (22) is formed of conventional materials that render optical reflector (22) semi-reflective so as to reflect a portion of the emitted light back to aperture (14) and transmit the remaining portion of light there through. The optical reflector (22) can have a transmittivity up to about 30% (or a reflectivity of at least about 70%), and preferably a transmittivity of up to about 50% (or a reflectivity of at least about 50%). The optical reflector (22) can be formed of light transmissive materials such as various plastics or glass. *A variety of conventional antireflective coatings or layers can be applied to the surface of optical reflector (22) to produce the desired reflectivity or transmittivity properties for a particular application.* During operation of laser system (20), semiconductor laser (10) emits a diverging beam (26) that is incident upon optical reflector (22) The remaining portion of beam (26) is reflected back towards facet (14) of semiconductor laser (10) to produce an optical feedback effect. A variety of conventional optical coatings or layers can also be applied to the surfaces of beam splitter (36) to produce the desired reflectivity, transmittivity, or deflection properties for a particular application.

Given the structure of the reference to Zorabedian et al ('215), which discloses all of the structure of claim 1 exclusive of the curved retro-reflector, the following combinations are obvious:

(Claims 1 and 11): A laser medium (102) having a back facet (104) and a front surface (106), whereby the laser medium emits a

laser beam through the front surface (106) into an external cavity defined in length by a cavity end mirror (122) reflecting the laser beam back towards the laser medium (see col. 4 lines 35-48) and a wavelength tunable filter (162) between the laser medium and the cavity end mirror (122) for tuning the wavelength of the laser beam, wherein the laser medium (102), the wavelength tunable filter (162), and the cavity end mirror (122) are arranged in a spatially linear cavity structure substantially in a line without angular re-direction of the laser beam in the cavity between the laser medium and the cavity end mirror (see fig. 1A and col. 4 lines 49-67 and col. 5 lines 1-67), at least one portion of the laser beam within the cavity after passing the wavelength tunable filter and before again passing the laser medium is coupled out as an output beam, and the cavity end mirror is partly transparent for coupling out a first output beam (see col 5 lines 41-46). When one considers claim 1 in view of the references, it would further be obvious that one of ordinary skill in the art:

(a) desiring *mode control* and to output a portion of the laser beam from the cavity after being retro-reflected by the end mirror (32) would be motivated to substitute the curved retro-reflector end mirror (32) of Hwu et al('703) for the retro-reflector end mirror (122) of Zorabedian et al ('215) since it is well-known in the art that one end reflector can be substituted for another end reflector depending upon the desired result or intended use; further since the beam splitter (36) of Hwu et al('703) is used to take at least one portion of the laser beam out of the cavity one of ordinary skill would be motivated to substitute the *beam splitter* (36) of Hwu et al('703) within the cavity of Zorabedian et al ('215) such that the beam after passing the wavelength tunable filter in Zorabedian et al ('215) and before again passing the laser medium is coupled out as an output beam(see fig.4 of Hwu et al('703); or

(b) desiring to *wavelength tune* the external cavity of Hwu et al('703) would be motivated to substitute the wavelength tunable filter (162) of Zorabedian et al ('215) into the laser system of Hwu et al('703) between the laser medium and the cavity curved retro-reflector end mirror (32) of Hwu et al('703) for tuning the

wavelength of the laser beam, wherein the laser medium, the beam splitter(36), the wavelength tunable filter (162), and the cavity curved retro-reflector end mirror (32) are arranged in a spatially linear cavity structure substantially in a line without angular re-direction of the laser beam (see fig. 4) and at least one portion of the laser beam within the cavity after passing the wavelength tunable filter and before again passing the laser medium is coupled out as an output beam, and the cavity curved retro-reflector end mirror (32) is partly transparent for coupling out a first output beam. As to the *three-dimensional* retro reflector of claim 11; since any retro reflector which has length, width and height is three dimensional, and since the claimed retro-reflector functions as any other retro-reflector it is obvious that all of the structure of claim 11 inclusive of the *three-dimensional* retro reflector is met by the reference combination and one of ordinary skill in the art would be motivated to use either of the retro-reflectors of Hwu et al(6,002,703) or Zorabedian et al ('215) as a *three dimensional retro-reflector*. Claims 1 and 11 are obvious.

(Claim 2): With regard to the beam splitter of claim 2 such elements are well-known in the art for their ability to pass a portion of the beam while splitting out another portion of the beam; thus, it would be obvious to one of ordinary skill in the art desiring to take a portion of the beam out of the linear direction to use a beam splitter(36) to accomplish this result. Further it would be obvious that the beam could be taken out at any location between element (106) and (114) to include between elements (130) and (106) of Zorabedian et al ('215) or at the beam splitter (36) of Hwu et al('703). Claim 2 is obvious.

(Claim 3): With regard to the back facet of the medium being partly transparent so that a portion of the laser beam within the cavity is coupled out as a second output beam, (see col 5 lines 41-46). Claim 3 is obvious.

(Claim 4): With regard to at least one of the laser medium (103) or the cavity end mirror (122) being moveable in the linear direction to adjust the optical path length of the cavity to the wavelength tuning provided by the wavelength tunable filter (162),

it would be obvious to one of ordinary skill in the art given the teaching of using one translator (144)(see col.5 lines 47-65 and col.6 lines 1-27) that one desiring to adjust the optical path length of the cavity would be motivated to use a translator to adjust the path length of the cavity by translating the gain medium or the cavity end mirror, if desired. Claim 4 is obvious.

(Claim 5): With regard to a synchronizing unit to synchronize the optical path length of the cavity with the wavelength tuning provided by the wavelength tunable filtering order to provide the laser beam to be substantially mode hop free when tuning the wavelength, (col. 6 lines 16-33). The synchronizing unit is *inherent* in the reference combination. Claim 5 is obvious.

(Claims 7 and 12): With regard to the cavity end mirror (claim 7) (see col. 4 lines 35-48 of Zorabedian et al ('215) or the three-dimensional retro-reflector (claim 12) (see col. 5 lines 33-45 and figs. 3 and 4 of Hwu et al ('703) being partially transparent, it would be obvious that one of ordinary skill in the art desiring to output a particular wavelength beam would be motivated to use the coatings of either of Zorabedian et al ('215) or Hwu et al ('703) in the device of the reference combination to produce a partially transparent: end mirror (claim 7) or three-dimensional retro-reflector (claim 12). Claim 7 is obvious.

(Claim 8): With regard to the beam splitter of the reference combination ,as indicated in claim 2 above, such elements are well-known in the art for their ability to pass a portion of the beam while splitting out another portion of the beam; thus, since beams 150-152 exit the cavity (see col. 5 lines 41-46); it would be obvious that one of ordinary skill in the art desiring to take a third beam out of the cavity would be motivated to use a beam splitter disposed with different coating specific to a particular different wavelength on each side of the bean splitter to accomplish this result. It would further be obvious that the beam could be taken out at any location between element 106 and 114 to include between elements 130 and 106 or at the beam splitter of Hwu et al('703).. Claim 8 is obvious.

(Claim 10): With regard to the device for focusing the laser onto the cavity end mirror; focusing lenses are notorious in the art for their ability to focus a laser beam and the Examiner takes Official Notice that focusing a laser beam onto an end reflector is obvious as evidenced by the reference to Pam (6,459,844) which discloses an external laser cavity wherein optical signals are directed to and from reflector 74 by a lens structure 90 (see col. 10 lines 6-14). Claim 10 is obvious.

Applicant's arguments filed 10/27/03 have been fully considered but they are not persuasive. Applicant's state on p.9 of heir remarks, *"The Office Action suggest that the cavity end mirror of claim 1 is described by the Zorabedian et al patent's disclosure of a retroreflector 122. Applicants have not found any description or suggestion in the Zorabedian et al patent that retroreflector 122 can be configured as a curved mirror. As such the Zorabedian et al patent neither describes nor suggests a cavity end mirror wherein the cavity end mirror is curved, as recited in claim 1. Accordingly claim 1 is both novel and patentable over the Zorabedian et al patent."*

When one consider these comments in view of the reference combination of Zorabedian et al ('215) (see figs. 1A-8A) when considered with Hwu et al('703), it becomes clear that, at best, the purported novel curved surface retro-reflector end mirror is rendered obvious by the disclosure of Hwu et al(6,002,703) which when incorporated into Zorabedian et al ('215) renders all applicants claims obvious.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The reference to Zorabedian et al ('215) is not being supplied, as it was cited in the previous Office action.

Naganuma (5,483,341) is cited for its teaching of a translator used to adjust the cavity end mirror and thereby the path length of the cavity (see fig.1).

Esterowitz et al (5,272,708) is cited for its teaching of a translator used to adjust the cavity end mirror and thereby the path length of the cavity (see fig.1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Scott, Jr. whose telephone number is 703-308-4884. The examiner can normally be reached on Monday - Friday, 6:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul P. Ip can be reached on (703)308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are

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703-308-7721 for regular communications and 703-308-2864 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.


Leon Scott, Jr.
Primary Examiner

Leon Scott, Jr.
Primary Examiner
Art Unit 2828

Isjr
December 13, 2003